

October 10th, 2019

1 What this is

This handout has the unusual property that it was written *after* the class it documents. This is more a recollection of what we covered so that we will have it as a reference point.

It is also intended for use in doing homework 5.

2 The problem with subject agreement

Up until the previous class, we had a kind of explanation for how we get subjects to agree with their verbs. Specifically, we ruled out subjects and verbs that do not agree by supposing that this leads to a feature clash.

Here is a quick review of the story.

2.1 Part 1: *give* selects for a PP headed by *to*

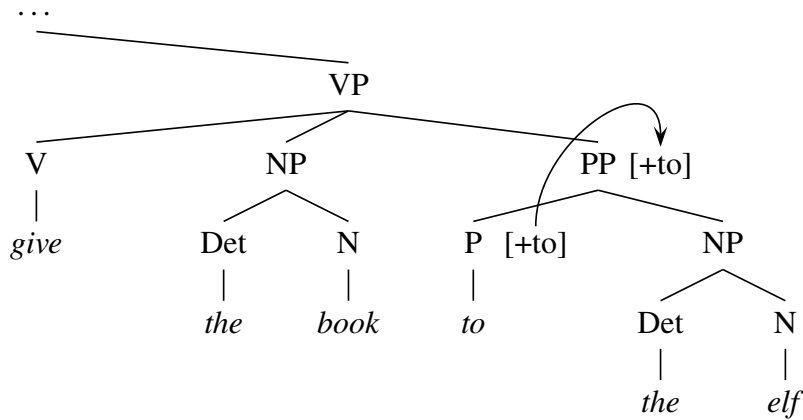
For a verb like *give*, it seems to have a requirement that it occur in a frame that has an NP (the thing being given) and a PP (indicating the destination of the giving). But the PP that it occurs with is constrained pretty tightly. Specifically, it has to be a PP headed by the preposition *to*. We can express this requirement by putting a feature specification the PP in the subcategorization frame that we assign to *give*, like so:

	⋮
<i>to</i> ,	P, [+to]
<i>give</i> ,	V, [+ ___ NP PP _[+to]]
	⋮

However, this is not quite enough because, even if the P *to* has the feature [+to], the subcategorization frame on *give* requires that the PP (that *to* heads) have the feature [+to]. So we need to suppose that the features of the head P become the features of the PP as well. In fact, we'll assume this more generally, by positing a principle of feature passing:

Principle F: Features pass from a head to phrase it projects.

So the feature [+to] moves up from P to the PP, and now the sister of *give* is a PP with the [+to] feature, as required by the subcategorization from on *give*.



2.2 Part 2: Subjects and verbs agree

The form the verb takes depends on properties of the subject. So: a singular subject (like *Lisa*) must go with a singular form of the verb (*likes* and not *like*). And a plural subject (like *they*) must go with a plural form of the verb (*like* and not *likes*).

- (1) a. They like Bart
 b. * Lisa like Bart
 c. Lisa likes Bart
 d. * They likes Bart

Principle F as hypothesized above had nothing to say about this situation, because the subject NP and the predicate VP are both daughters of S, but neither serves as the head of S. So, we took advantage of this and added a new hypothesis for this situation. Here I will call it “Principle G” though it was not given a name before. It says that if there is no head, then the features of all the daughters become the features of the mother.

Principle G: Features pass from all daughters to their mother node if none are its head.

This gets the result we want. If the subject NP and VP have values of, say, [+pl] and [-pl] that conflict, then the resulting S node has both [+pl] and [-pl], which we additionally suppose is an impossible representation.

Coherence assumption: A node cannot have both + and – values for an individual feature type.

That is enough to predict the facts in (1).



2.3 An aside about pronouns

Before continuing on with the story, a note about the pronouns in the tree above. The pronouns in English include *they, them, I, we, us, him, her, you, me, he, she, it*. We believe that they are NPs because they go where NPs can go (that is, they can be subjects or objects). Some forms are specifically for subjects (*I, they, he, she, we*), others are not (*me, them, him, her, us*). We will worry about that part later. But one part we might consider now is: If *we* is an NP, then is it also an N, and what determiner goes with it? That is, if we assume that all NPs need a Det and an N, what is the Det if *we* is the N?

It will turn out in fact that *we* kind of seems more like a Det than it seems like an N. You can't modify *we* with an adjective (**fabulous we left*), and you can't use a regular determiner with it (**the we left*). In fact, there are cases where *we* seems to go in the same place a determiner like *the* goes: *we happy linguists will (all) leave*.

So, really, it's going to best to consider *we* the Det. And then it is constrained to (usually) occur with a silent N. (Note that we have silent Ns in some other cases, like in *the poor*, where *poor* there is an adjective describing an unspoken N meaning 'people.')

However: to postpone worrying about the internal structure (or lack thereof) of pronouns like *we, I* have instead opted to just draw them as NPs with triangles. The triangle means "whatever internal structure there may be here is not important for present purposes." Until we work on this more explicitly, you can/should do the same.

2.4 An aside about ϕ -features

Above the example of agreement was with [+pl] and [-pl]. But in fact agreement in English is also conditioned by person (first, second, third). It is only the third person singular that appears with an -s (*She writes*) First person singular and second person singular do not (*I write, You write*).

In languages with gender (masculine, feminine, or neuter), there is also agreement in gender.

Generally, person, number, and gender go together in the languages of the world. Agreement is usually responsive to these as a group (if a language makes those distinctions). We adopt the term " ϕ -features" a description of all of these agreeing features together. Historically, the choice of ϕ there is really just due to the fact that ϕ corresponds to "f" in Greek, and these are features. But " ϕ -feature" does specifically refer to the collection of person, number, and gender features that an NP might have or that a verb might agree with.

2.5 Selection for clause type leads to C

Then, in the previous class, we looked at the fact that (a) sentences come in different types (such as declarative and interrogative), and (b) certain verbs can be selective about which type of sentences can serve as an object.

The sentences that can serve as objects of a verb of this sort are (usually) introduced by a pronounced **complementizer** like *that*, or *whether*. The complementizer (C) determines the clause type of the sentence. So we need to suppose we can form CP out of a C and a sentence, and then the feature projection principle (Principle F) will pass the clause-type features up from C to the CP.

- (2) CP \rightarrow C S [C is the head]
- (3) *whether*, C, [+Q]
- (4) *if*, C, [+Q]

(5) *that*, C, [+D]

(6) \emptyset , C, [+D]

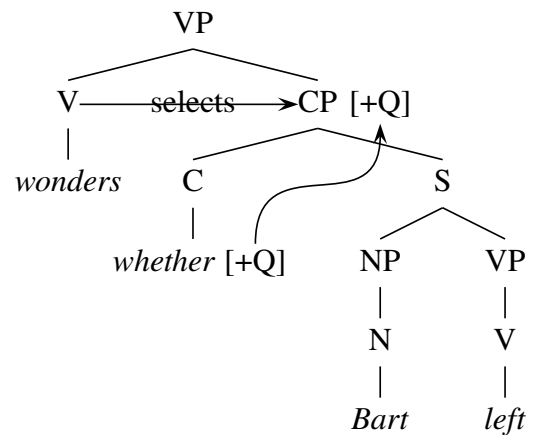
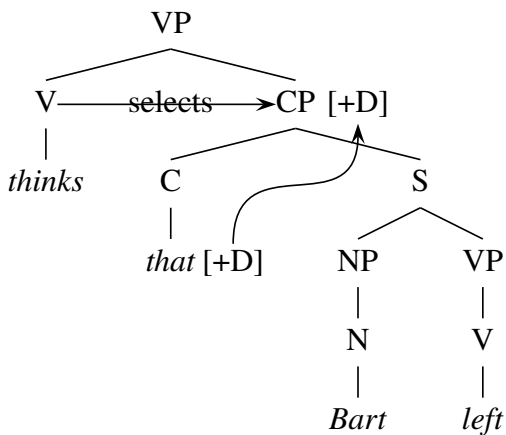
So, *ask* requires a CP object that is interrogative. And *believe* requires a CP object that is declarative. And *know* can take either kind. So we can encode this selectivity, like we did for *give* and its PP, in the subcategorization frames of the selecting verbs.

And finally we can specify the lexical entries for our example embedding verbs:

(7) *ask*, V, [+ __ CP_[+Q]]

(8) *believe*, V, [+ __ CP_[+D]]

(9) *know*, V, [+ __ CP]



So the conclusion of this discussion (from previously) is that the clause type originates in C and takes the form a feature like [+D] (declarative) or [+Q] (interrogative/question). The CP inherits the feature from its head. And then a verb that has CP as its object can additionally require a particular type of clause by specifying it in its subcategorization frame.

2.6 Selection for finiteness leads to T

The conversation continued using much the same argumentation to lead us to conclude that C can select for specific types of sentences as well. So, sentences can be non-finite (with a *to* form of the verb), or finite (with a tensed/agreeing form of the verb), and different Cs go with each.

So *for* is a C that goes with a non-finite (infinitive) S, as in *They want for you to leave*. And *that* goes with finite (tensed) S, as in *They said that you left*.

We can use the same argument to suppose that S has a head, and that head is where the tense information is (finite or nonfinite). It makes sense to call that head T (for tense), and then that just means that if the head of S is T, we may as well call S "TP." So we will.

And this solves the selection problem for *for* and *that* perfectly well.

But it opens up a new problem, which is that we lose access to the explanation we had before about how subject-verb agreement is enforced. That relied on S not having a head and so getting features from both the subject NP and the predicate VP that could then clash. But if S ("TP") has a head now, the features of TP should be the features of its head (T).

This means that "Principle G" is probably no longer useful for anything, if we take this even one step further and suppose that there aren't any phrases that lack a head. S was the only one we'd had, and we have reanalyzed that as being a TP headed by T.

And so now we come back to the issue that launched the discussion: we would like to be able to explain why subjects and verbs agree, and our old explanation is now no longer available.

3 Types of explanation

There are basically two kinds of explanation for this agreement that we can consider. One is that agreement is enforced because if you have a subject and verb that don't agree, you wind up with a feature clash somewhere. This is the *kind* of explanation that we had before. And we could try to work out how features move through the tree to recreate that explanation.

The second kind of explanation is that agreement is enforced by virtue of it being assigned. On this kind of view, the NP has the ϕ -features, kind of intrinsically (it has person, number, gender), and those values are copied over to the verb. The verb starts off by lacking agreement features, and then gets them from the subject NP somehow. This then enforces agreement not by virtue of penalizing mismatch but by preventing mismatch from arising in the first place.

Either way could be right. We talked about some reasons why the assignment kind of explanation might be better and fit in better with the sort of view of morphology that separates pronunciation a bit from syntax. The examples of this were like the comparative (*taller* vs. *more intelligent*), where the semantics and probably even syntax of these comparative adjectives should be the same, even if the comparative is realized as *-er* on the short adjectives and as *more* on the longer ones. Similarly, the French examples where *à* 'to' and *le* 'the(masculine)' are realized as *au* 'to+the(masculine)' even though the semantics and syntax should still reflect the endpoint of a path at a definite noun.

4 Specifiers

The strategy that I pursued in class was to try to make the case that there is reason to think that the "specifier" position also shares features with the head. But in order to get to this, I needed to talk about what specifiers are.

Most of you will have encountered specifiers in previous courses, like Intro to Linguistics. But basically, they are a specific position in the "X-bar" structure, which I also kind of rapidly introduced in class and will run through very quickly here as well.

4.1 X-bar structure

The "X-bar" syntax is basically a generalization over a wider set of phrase structure rules, taking the observation that most of the phrase structure rules we have seen are such that there is a head, and then a spot to the left of the head, a spot to the right of the head, and an ability to iterate in the middle. The idea is essentially that we can *derive* the phrase structure rules from a more general schema. The schema looks like this:

$$(10) \quad XP \rightarrow (YP) X'$$

$$(11) \quad X' \rightarrow X' WP$$

$$(12) \quad X' \rightarrow WP X'$$

$$(13) \quad X' \rightarrow X (ZP)$$

The "X" (and "W", "Y", and "Z") here stands for any category, so from this schema we derive phrase structure rules like

$$(14) \quad VP \rightarrow V'$$

$$(15) \quad V' \rightarrow V NP$$

There is a lot of complexity and nuance here, and the full exposition of X' theory and concerns about it will take some time to work through. However, the main thing I want to point out here is that there is a single position called a “specifier” that is a YP (that is, a phrase of some type) that is sister to X' and daughter to XP.

The specifier is the place where *wh*-phrases go in English *wh*-questions. It is the place where the thing in “first position” goes in a German or Dutch sentence where the tensed verb is in “second position” (which we understand as being in the position of C). It is the place in English where *never* goes in a negative-inversion sentence like *never have I seen such a thing*.

In particular, I wanted to try to at least weakly make the case that in *wh*-movement in English, the C is the head in the structure that has the information about it being a question (we said it has a [+Q] feature), and that it also has the “need” for a *wh*-phrase. The reason that a *wh*-phrase moves up to the specifier of CP in an English *wh*-question is that C needs a *wh*-phrase (something with a [+wh] feature), and *wh*-phrases have a [+wh] feature.

The argument essentially was that moving a *wh*-phrase (with its [+wh] feature) up to the specifier of CP puts it “close enough” to the head C that the need C had for a [+wh] feature is satisfied.

Put more basically: the features of the head are shared with the specifier.

So, in conclusion, this is a second type of feature percolation. The features of a head become the features of the phrase it heads (that is Principle F), and the features of a head also take on the features of the phrase in its specifier. This latter principle we will call Spec-Head Agreement.

Spec-Head Agreement: Features pass from the specifier of a phrase to its head.

5 New assumptions about structure

Given that we are now going to want to have specifiers and heads and at least some version of X' structures implemented, let me take a second to re-outline the current state of the phrase structure rules that build up our trees. We are essentially following the X' schema now, although the X' schema itself is not part of the rules. I am also cutting a corner or two, based on the things we need to do.

The additions/changes here from last time this was outlined are:

- What we used to call S, we now call TP.
- TP has a head, which we call T.
- The subject of TP is going to be its specifier, and the VP will be daughter to T'.
- CP has a head and an optional specifier.
- TP, CP, and VP will always have bar-level nodes now. (So if there is a CP, there is also a C'.)
- For the moment I am limiting the category of what is in the specifier of CP or TP to be NPs. Later we will need to allow other things.
- I am using parentheses to indicate options below, but keep in mind this is just shorthand. “(NP) C'” is a short way to write “C'” and “NP C'” in a single line.
- I have changed the VP so that adjuncts are now attached to V' (rather than VP).
- I have disallowed specifiers to PP for now, but that means we don't predict “right over the fence.”

- I have disallowed adverbs adjoining to adjectives and adverbs for now, so this means we don't predict "very happy" and "very obviously".

CP	→	(NP) C'
C'	→	C TP
TP	→	NP T'
T'	→	T VP
VP	→	V'
V'	→	V (NP)
V'	→	V NP PP
V'	→	V NP NP
V'	→	V CP
V'	→	V' Adv
V'	→	Adv V'
V'	→	V' PP
NP	→	Det N'
N'	→	(Adj) N'
N'	→	N' PP
PP	→	P'
P'	→	P NP

Other notes: I didn't say this in class, but conceptually if a sentence is a statement, and that semantic information is assumed to be in C, then there must be a C in any statement. The topmost C in English (and more generally) seems to have to be silent. We don't have an explanation for why, we just stipulate that. There is a C in a main clause declarative, and its content is the silent counterpart to *that*.

6 Getting subject agreement

Since by now this handout is getting long and the hour is growing late, let me bring this back around to showing how we might derive subject agreement this way.

Here is what we are trying to do: We want the features of the subject to go to T, which happens because the subject is in the specifier to T (so the features move to T due to Spec-head agreement).

We still need to connect the features of T to the features of V, and we have not provided a way to do that. To get this to work, let us suppose that there is something special about T and V: The tense features need to be assigned to a verb.

I am partly thinking ahead to *do*-support here, where it will turn out that the tense needs to have its features realized (to the extent that we will insert *do* in order to allow them to be realized). I'm also trying to think ahead to how we might want to explain French verb movement to T. But the idea is essentially that tense wants to pass its features on to a verb, which it does by passing them on to its sister, the VP.

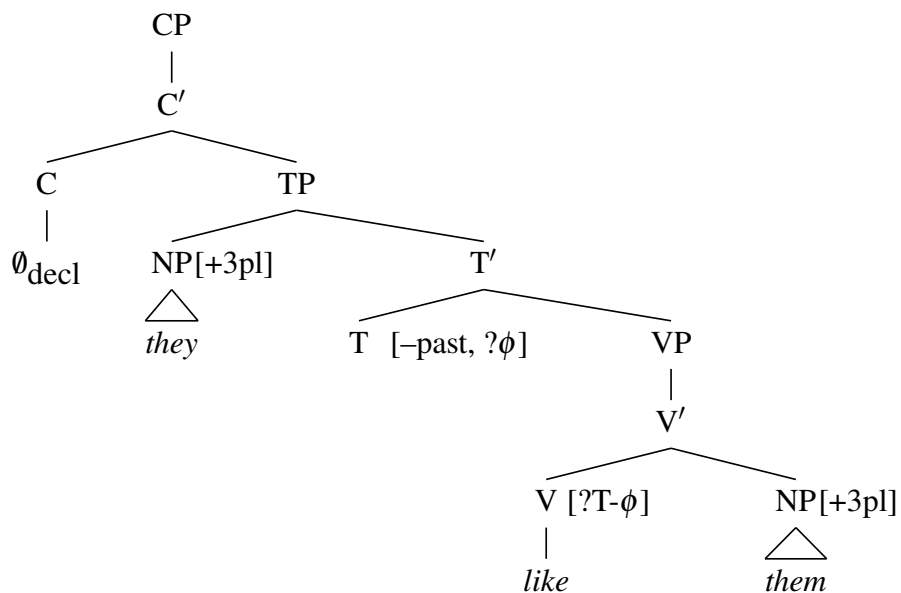
Suppose we then generalize Principle F so that instead of saying that features move from the head to the phrase, we say that the features are simply shared between a phrase and its head. This means that if T assigns a feature to VP, then that feature is effectively also assigned to the head.

Lastly, we have in the lexicon the information that the verb *like* is pronounced as *like* if it is [+pl] and *likes* if it [-pl].

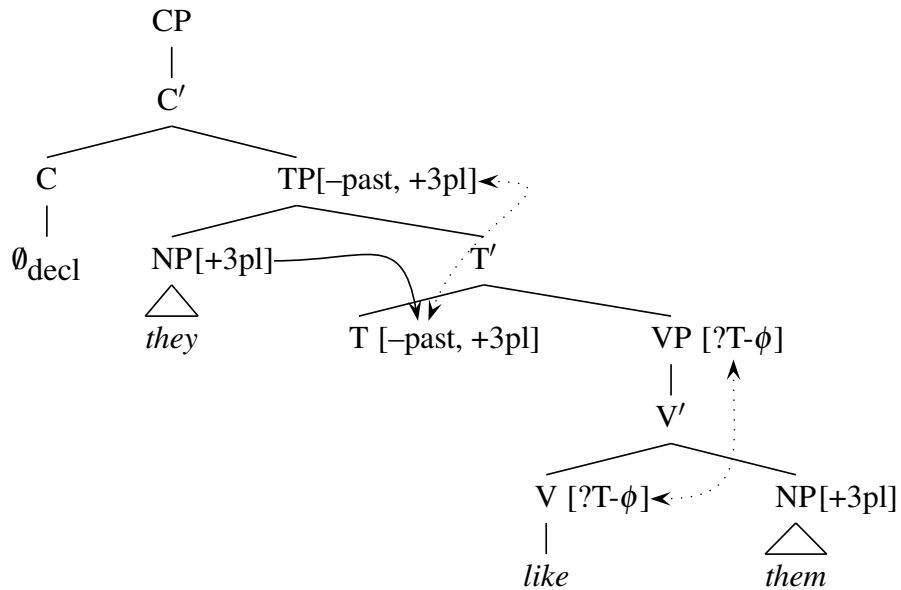
So, let me line up succinctly the things we need, and then I will demonstrate it. The derivation will occur in a couple of steps.

- V starts out with empty (unfilled) agreement. I'll call this feature [$?T-\phi$], meaning that it is a space that *can* hold tense and ϕ -features, but currently does not.
- NP (e.g., the subject NP) starts out with defined agreement features (ϕ -features), like [+3pl] (3rd person plural).
- T starts out with a tense feature (like [+past]), as well as an empty (unfilled) ϕ -feature space ($[? \phi]$).
- **Spec-head agreement:** (Certain) features (including at least ϕ -features) are shared between the head and its specifier.
- **Feature percolation:** (Certain) features (including at least tense and ϕ -features) are shared between a phrase and its head. (This was called "Principle F" before.)
- **VP inflection:** T passes on (certain) features (including at least tense and ϕ -features) to a sister of category V.

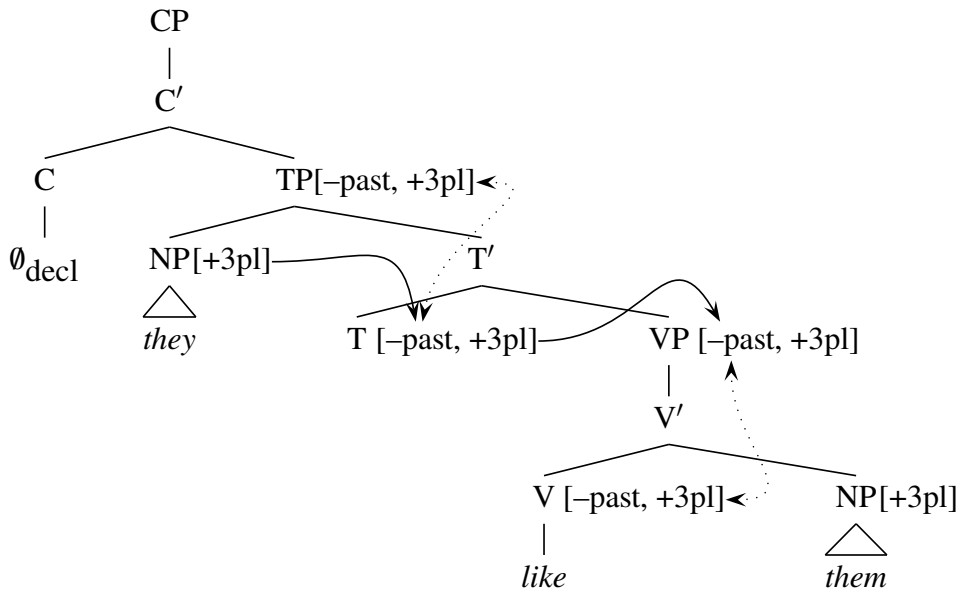
This should be clearer with a demonstration. Let me demonstrate with a diagram of *They like them*. In the first step, let's just see where the features are before they get shared around.



Step two: the features of the subject are shared with T (which goes from being [$? \phi$] to having the [+3pl] from the subject; this is Spec-Head Agreement). The features of the T are automatically the features of the TP as well (Feature Percolation). Same for V and VP.



Step three: the features of T are assigned to VP (VP inflection). The features of the VP are automatically the features of the V as well (Feature Percolation).



Step four: when the verb is pronounced, it is the form of *like* for the non-past, 3rd person plural context, which is *like*.

7 Homework

Given the example above, it should be possible to see how to do the homework problems on the same model. Here are some specific notes.

7.1 Part 1

The first part is drawing four trees and listing complements and adjuncts, with some brief prose about what led you to classify things as complements or adjuncts. You do not need to define the lexical items, or any phrase structure rules. The trees should follow the new structure rules here. So:

- There should be a CP, a C', and a C (which will be the silent declarative complementizer \emptyset_{decl} like in the trees above in this handout).
- There should be a TP, a T', and a T, and the subject NP should be in the specifier of TP (that is, it should be an NP that is a sister to T', like in the trees above in this handout).
- The T in all of these examples is past, so it should have the feature [+past]. T is not actually pronounced itself, its features are pronounced with the verb. You do not need to draw any features moving around in this part, just call T [+past] and leave it at that.
- For PPs, following the phrase structure rules above, there needs to be a P'.
- For NPs that are proper names (e.g., *Chris*), there should be a silent determiner that goes with proper names. You can call this \emptyset_{prop} .
- For *his*, assume it is a Det.

I think that is all you need for Part 1.

7.2 Parts 2–3

Part 2 is really what motivated all of this. The task there is really just to draw some trees with agreement features, but it was designed for the old system. So, we can use it to try to practice/understand the system from this handout instead.

- *Printers* is a bare plural (it should have the silent Det we called SOME, that I usually write as \emptyset_{pl}). The whole subject NP will be 3rd person plural.
- Draw arrows showing all the feature sharing like in the example earlier. You don't need to show all the steps like I did here, just the final form. So, the features of NP being shared with T, with TP, with VP, then V.
- For #3 and #5 (the ungrammatical ones), don't draw a tree, just write a short sentence saying why they cannot be generated.
- For #4 and #6, draw pronouns as NP with a triangle under it, like I did earlier in this handout.

What is happening in sentences #4 through #6 is really an exploration of how you handle the subject and object case forms of the pronouns. It is similar to subject agreement but it is not quite the same. And I have not given you much guidance on this.

Let me say a couple of things though: The case form a pronoun has depends on where it is. So, a subject gets the subject case form. The subject is defined by being the specifier of TP. It shares its features with T (Spec-head agreement). The way we will want to handle these is by supposing that T has a [+sub] feature (in addition to the features we've discussed), and an NP has a feature like [?case], a place where

a case feature like [+sub] can be filled in. So, when the subject NP is in the specifier of T, the subject's [?case] feature is filled in as [+sub]. And then the pronunciation of a 3pl +sub pronoun will be "they."

With that much, you can probably work out how to allow #4 and rule out #5. For #6, we have an object pronoun as well, so you will need to think about how you can make that work. I can think of a couple of ways you could go, so this is one place I will set you free to think about it without guiding you too carefully in a direction.

For Part 3, the question is really how we ensure that subject forms don't occur in object position. This is basically paired with #6 from Part 2. The question in Part 3 makes a little bit less sense now than it originally did, but just explain how the way you got #6 in Part 2 can rule out #1 in Part 3 (assuming it does—if you get stuck on this, then explain why it is difficult instead).